The visual value of historic architecture

Owing to the use of mathematical information theory and the theory of semiotics, the visual qualities of architectonic environment can be more precisely described than ever before. We can thus produce rational arguments for the preservation of old structures based on the quantity of visual information they provide as a necessary condition for a satisfying townscape.

The basis of this approach is the treatment of architecture as a message, its elements being signs selected from a vocabulary.

There are two different kinds of information, 'symbolic information' and 'aesthetic information'.

In the sense of a language, architectonic elements in the past had meanings, genuine or by association. The history of architecture shows that fundamental vocabularies, which go back to the antique or middle ages, have survived and were used up to the beginning of this century. Each stage of observation might promote associations with the original context, functions or symbolic meanings of these elements. And even if this language has often been used mechanically rather than artistically, those meanings can still be 'read', employing the imagination and knowledge of the beholder.

The transmission of aesthetic information is, however, independent of background knowledge. It concerns the stimulation of perception itself caused by the variety and number of architectonic elements belonging to an historical vocabulary. In this context information as a cybernetic term means a mathematical description of a field of elements in a certain state of probability, decoded into binary digits and measurable in BIT. Here it is to be understood as a transcription of physical visual challenge.

The mathematical formula for this operation is:

$$I_{tot} = \sum_{i=1}^{n} N_{(xi)} \cdot {}^{-2}\log \frac{1}{P_{(xi)}}$$

I_{tot} = total information
n = number of different elements in the vocabulary
$N_{(xi)}$ = frequency of an element (i)
$p_{(xi)}$ = probability of an element (i)

The quantum of information is dependent on the length of the message (number of all elements employed) in relation to the probability with which every element actually appears: the more different elements there are and the less each one appears the greater will be the information.

The enormous quantum of information we receive at a first glance has to be reduced by the beholder, because according to information psychology our visual memory is restricted to 160 BIT per

10 seconds, the capacity of the short-time-memory-store. Consequently in a first phase we have to group signs or elements into 'supersigns' thus gaining a new and smaller repertoire and fewer elements. This automatic process in the moment of perception means at one instance the revelation of order (redundancy) and the reduction of information by simplification. The actual simplification is largely determined by rhythms, orders and patterns. Recognizing them we follow the architect's artistic intentions. But if the structure is very complex there remains an abundance of possible combinations for this unconscious process of selection and synthesis. Simplification must go on up to that point of about 160 BIT where we are facing the simplest scheme of the object easily readable at one view. Only from here in a second phase can we retrace the steps to simplification in the reverse order and slowly enrich the information again by drawing our attention to the neglected details. These possible changes between the levels of complexity are essential, because aesthetic information is defined as that amount of enrichment we gain during the second phase by the transition from a simpler level to a more complex one. In other words it is that information-quantum that elements still contain when their place within a simplified supersign is known. Aesthetic perception may be described as a process of learning that transforms a diffuse chaotic totality by

reduction and analysis into a complex ordered one. A vast number of different elements and of potential order within an architectonic message are necessary conditions for aesthetic perception. In effect, the classical demand for 'unity within diversity'.

What kind of influence has the visual information of architecture on the townscape ?

The capacity of historical architecture to employ our perception and imagination for a long time establishes a psychological connexion between us and our environment, the latter being experienced as 'interesting'. In comparison, average modern architecture offers remarkably little visual information. Neither does the modern repertoire contain any symbolic aspect nor any considerable amount of 'aesthetic information'. Working to a general grid pattern the new architecture explores the principle of endless addition and the repetition of a few elemental norms : once we have seen a corner we have seen the whole. Normally the effect is monotony and our reaction boredom, if significance is not achieved by unusual height or outline.

Moreover we have to realize that the visual information of a single house cannot be isolated from its context (group, street, quarter). The trend to replace old structures by new ones therefore has two interdependent results on the visual

quality of the areas concerned:

1. The historic language of architecture becomes more and more unexpected. Hence the quality of its visual value is steadily strengthened.
2. At the same time as the modern vocabulary is continuously extended in quantity, its monotonous character becomes automatically more prevalent as well. The greatest devaluation of the modern vocabulary is particularly evident where whole parts of a town are rebuilt using standard blocks and prefabricated elements.

As in the perception of the single house, the visual image of the whole town has to be built up in our minds as a hierarchy of single characteristic units as streets, squares, quarters and districts. It is the amount and quality of visual information that establishes the character of such units. Even orientation to a considerable extent depends on the clearly structural appearance of architectonic signs. But with the progress of destruction of cities, a chaotic mixture of old and new becomes the most common feature of nearly all quarters, apart from the new suburbs. This tendency increasingly prevents the experience of visual continuity and has an equalizing effect on the townscape of all cities, whose individual identity is often left to be visualized from some representative monuments in an alienated environment. Where whole quarters with an historical vocabulary survive as homogenous totalities they gain an environmental attraction because of the abundance of non-functional visual information and complexity.

Uninterrupted by the interference of a new vocabulary and a different scale they can be experienced as historically consistent unities of unique character. There is no need to turn a town into a museum or to construct a pastiche of the old architecture. The preservation of areas as totalities rather than of single isolated objects is an essential if architecture is to remain a visual communicator.

Conclusions: the effect of the demolition trend is not merely a matter of 'beauty' A high level of visual information both symbolic and aesthetic helps to produce the individual character and atmosphere of a place as well as our intellectual and emotional involvement during the act of perception. In fact both interdependent effects seem to be necessary conditions for the psychological identification with environment, that is so much endangered by the growing uniformity and anonymity of cities.

*Adrian v. Buttlar, Heinz Selig and Alexander Wetzig*

Critical to any reassessment of our situation is a reappraisal of our attitude to the past.

Architecture is a language conveying symbolic and aesthetic information.

Until 1900 architects used vocabularies based on those of the medieval or Roman periods. Each element demonstrated its historical background which becomes part of the process of perception. The number of symbolic associations is limited only by the knowledge and imagination of the beholder.
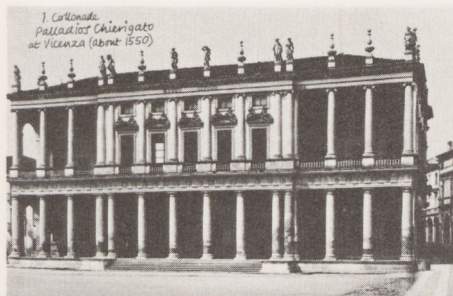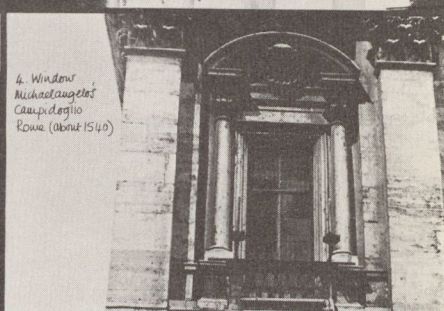

1. Colonnade
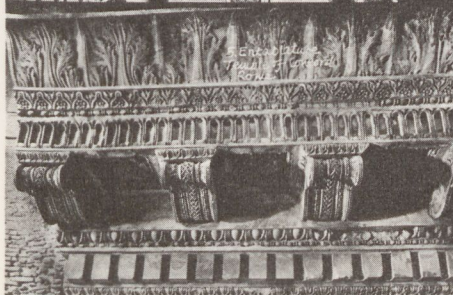Palladio's Chierigato
at Vicenza (about 1550)
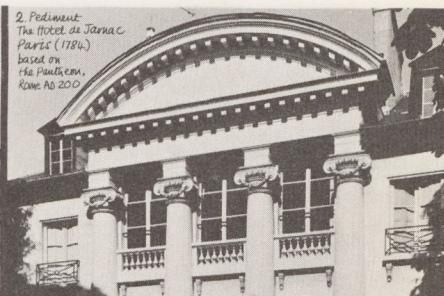
2. Pediment
The Hotel de Jarnac
Paris (1784)
based on
the Pantheon,
Rome AD 200

3. Scroll
St Agostino
Rome (1480)

4. Window
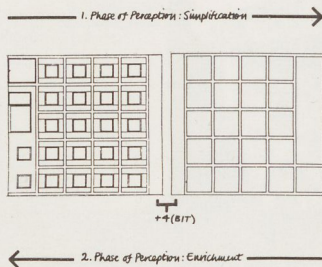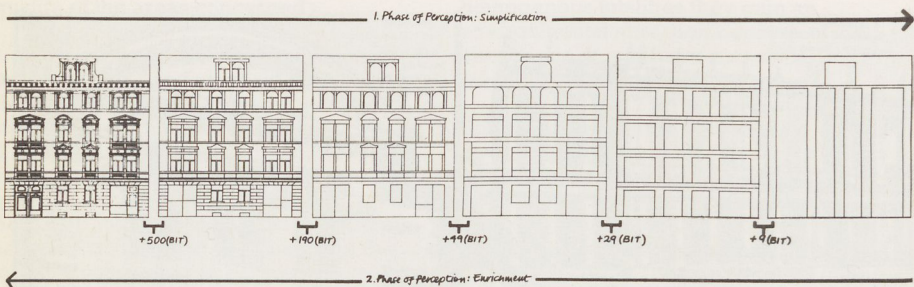Michaelangelo's
Campidoglio
Rome (about 1540)

6. Rustication
Palais du Luxembourg, Paris (1625)

Information theory decodes a message as a field of elements into binary digits (BIT). We can thus quantify the aesthetic information (i.e. optical challenges) in an architectonic message. Perception is stimulated by gaining aesthetic information. The beholder has to reduce a vast number of optical challenges to the restricted capacity of our visual memory (160 BIT) before he can observe details. The drawing shows the progressive simplifications required to see an historic house. Read the other way it shows the increase in aesthetic information between levels of complexities. An 'interesting' environment is characterized by a high level of aesthetic information, using a large vocabulary of different elements. Modern buildings, lacking associative potentiality, offer particularly low quantities of information and lose our interest in the first simplification.

1. Phase of Perception: Simplification →

+500(BIT) +190(BIT) +49(BIT) +29(BIT) +9(BIT)

← 2. Phase of Perception: Enrichment

1. Phase of Perception: Simplification →

+4(BIT)

← 2. Phase of Perception: Enrichment

A high level of visual information is not a matter of 'beauty'. It helps to establish the individual character and atmosphere of a place as well as our psychological involvement. Both aesthetic and symbolic information are necessary conditions for the identification of the environment, which is endangered by the growing uniformity and anonymity of cities.

As in the perception of a single house, the visual image of a city has to be built up in our minds as a hierarchy of characteristic units, places or districts of unique identity. To a considerable extent orientation depends on architectonic

signs. If you try to remember the West End your experience might translate into a diagram like this.

The steady increase in the number of modern buildings equalizes the experience of all cities. The chaotic mixture of old and new sometimes produces an amusing contrast. But it usually splits up the visual image of the town into tiny units. Here the contrast is no longer amusing. The scale of the flats is inhuman and overbears the remains of the historical vocabulary.

Homogeneity alone is no remedy. This late nineteenth century area shows a remarkable lack of character, due to uniformity combined with minimal visual information.
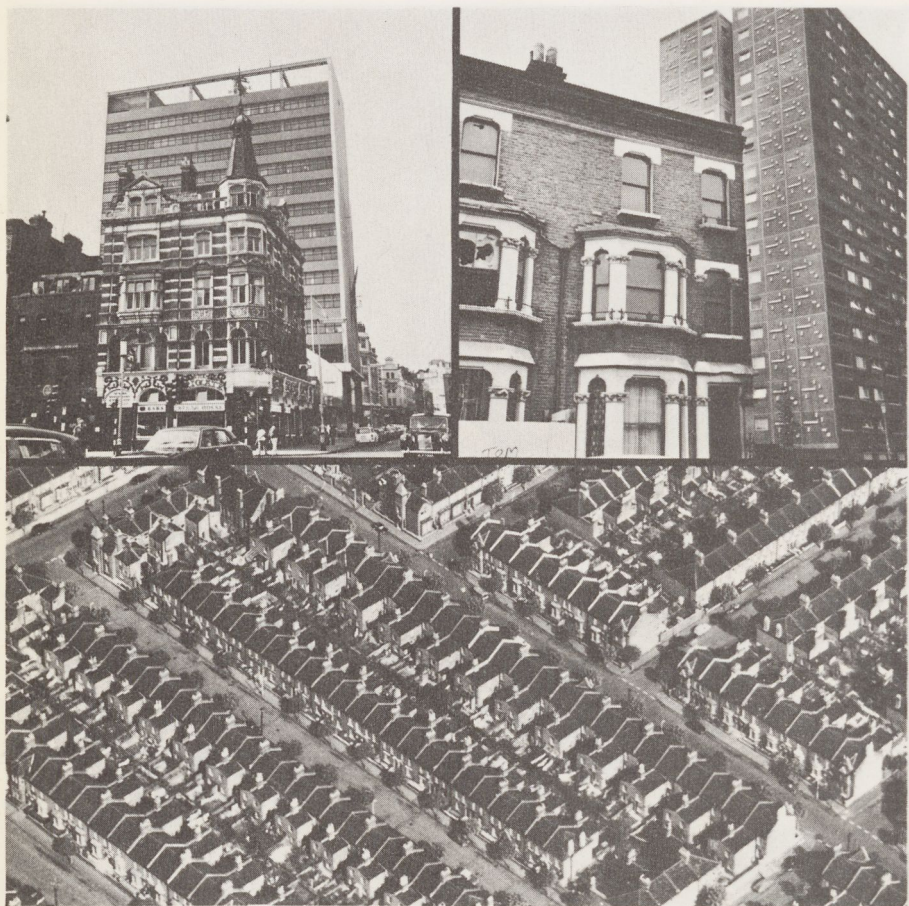
Where whole quarters with a rich vocabulary survive they represent a rare complex of high visual information. Such an area can be experienced as an historically consistent unity of unique character.

The preservation of such areas as totalities, rather than as isolated fragments, is essential to architecture as a visual communication.